

<110> Universiteit Utrecht Holding B.V.

<130> 2003-010

<160> 20

<170> PatentIn version 3.2

<210> 1

<211> 1818

<212> DNA

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Phe Ala Glu Asp Ala Leu Ala Ser Asn Ser Thr Leu Phe Ala Phe His  
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aag gaa cca aac aat cgt agg ctt acc aaa agg tct tca aga gga cag 192  
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Leu Leu Asn Ser Arg Arg Gly Ser Asp Asp Ala Ser Glu Ser Ser Asp  
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aga tac cca ggt agg tcg ggt ggc tct aag aat tcg agc caa tcc ccc 288  
Arg Tyr Pro Gly Arg Ser Gly Gly Ser Lys Asn Ser Ser Gln Ser Pro  
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tgg atc aag tat atg caa aag ttc gac att ccc cgt aac cac ggc tct      336  
Trp Ile Lys Tyr Met Gln Lys Phe Asp Ile Pro Arg Asn His Gly Ser  
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Gly Ile Tyr Val Asp Leu Gly Gly Tyr Glu Ser Val Gly Ser Lys Ser  
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Tyr Arg Met Pro Val Gly Lys Cys Pro Val Val Gly Lys Ile Ile Asp  
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Leu Gly Asn Gly Ala Asp Phe Leu Asp Pro Ile Ser Ser Asp Asp Pro

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Ser Tyr Arg Gly Leu Ala Phe Pro Glu Thr Ala Val Asp Ser Asn Ile	165	170	175	
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Pro Thr Gln Pro Lys Thr Arg Gly Ser Ser Ser Ala Ser Ala Ala Lys	180	185	190	
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Asn Asp Val Ala Asn Cys Ser Glu Tyr Ala Ser Asn Leu Ile Pro Ala	210	215	220	
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Ser Asp Arg Ser Thr Lys Tyr Arg Tyr Pro Phe Val Phe Asp Ser Asp	225	230	235	240
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Asn Gln Met Cys Tyr Ile Leu Tyr Ser Ala Ile Gln Tyr Asn Gln Gly	245	250	255	
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Asn Arg Tyr Cys Asp Asn Asp Gly Ser Ser Glu Asp Gly Thr Ser Ser	260	265	270	
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Leu Leu Cys Met Lys Pro Tyr Lys Ser Ala Glu Asp Ala His Leu Tyr	275	280	285	
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Tyr Gly Ser Ala Lys Val Asp Pro Asp Trp Glu Glu Asn Cys Pro Met	290	295	300	
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His Pro Val Arg Asp Ala Ile Phe Gly Lys Trp Ser Gly Gly Ser Cys	305	310	315	320
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Val Ala Ile Ala Pro Ala Phe Gln Glu Tyr Ala Asn Ser Thr Glu Asp	325	330	335	
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Ala Val Asn Glu Asp Phe Asn Glu Leu Lys Glu Leu Thr Asp Gly Leu	355	360	365	
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Ile Gly Ser Pro Leu Glu Tyr Asp Ala Val Asn Tyr Pro Cys His Ile	
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Leu Asp Val Pro Phe Glu Val Thr Thr Ala Leu Ser Met Lys Thr Leu	
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Lys Cys Asp Ala Tyr Val His Thr Lys Tyr Ser Asp Ser Cys Gly Thr	
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Tyr Phe Leu Cys Ser Asp Val Lys Pro Asn Trp Phe Ile Arg Phe Leu	
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His Met Ile Gly Leu Tyr Asn Lys Arg Ile Val Ile Phe Val Cys	
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Cys Thr Thr Thr Ala Ile Val Leu Thr Ile Trp Ile Trp Lys Arg Phe	
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Ile Lys Ala Lys Lys Glu Pro Ala Pro Pro Ser Phe Asp Lys Tyr Leu	
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 Lys Glu Pro Asn Asn Arg Arg Leu Thr Lys Arg Ser Ser Arg Gly Gln  
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 Leu Leu Asn Ser Arg Arg Gly Ser Asp Asp Ala Ser Glu Ser Ser Asp  
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 Arg Tyr Pro Gly Arg Ser Gly Gly Ser Lys Asn Ser Ser Gln Ser Pro  
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aag gat gac aat aaa aca aaa tct aaa ata aag tca aaa aca gca tca Lys Asp Asp Asn Lys Thr Lys Ser Lys Ile Lys Ser Lys Thr Ala Ser	100	105	110	336
att tta cct aga ctt tta aaa tct tta tca ttt tta gct gtt tta ggg Ile Leu Pro Arg Leu Leu Lys Ser Leu Ser Phe Leu Ala Val Leu Gly	115	120	125	384
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act tct aac cga acg ccc ttt gaa gta tca tta att caa agc aac agc Thr Ser Asn Arg Thr Pro Phe Glu Val Ser Leu Ile Gln Ser Asn Ser	145	150	155	480
agt tta tcg cct att cat aat tct tca act caa aat tca agt cat cac Ser Leu Ser Pro Ile His Asn Ser Ser Thr Gln Asn Ser Ser His His	165	170	175	528
aac ggt ttt agt ggt agt acc gtt aat aat acc tca tta ata gag aca Asn Gly Phe Ser Gly Ser Thr Val Asn Asn Thr Ser Leu Ile Glu Thr	180	185	190	576
agg aat aac gta tta aac aga aca cta ggt aga ttc gga tca ttt ttg Arg Asn Asn Val Leu Asn Arg Thr Leu Gly Arg Phe Gly Ser Phe Leu	195	200	205	624
caa tca gga ttg ata agc agt aga gca gac aaa aag aag cgg tct ggt Gln Ser Gly Leu Ile Ser Ser Arg Ala Asp Lys Lys Lys Arg Ser Gly	210	215	220	672
atg aat aga aga ggc cct aag ggg aag aaa ggg aag gga gga gaa gac Met Asn Arg Arg Gly Pro Lys Gly Lys Lys Gly Lys Gly Gly Glu Asp	225	230	235	720
gaa gaa aag agg aac aag tgg acc gat ttc atg gca aag ttt gat atc Glu Glu Lys Arg Asn Lys Trp Thr Asp Phe Met Ala Lys Phe Asp Ile	245	250	255	768
gct aag gtc cac ggt tca ggg gtt tac gta gat ttg ggt gaa tct gcc Ala Lys Val His Gly Ser Gly Val Tyr Val Asp Leu Gly Glu Ser Ala	260	265	270	816
acc gtt ggc agt tat gac tac agg atg cct ata gga aaa tgt cca gtt Thr Val Gly Ser Tyr Asp Tyr Arg Met Pro Ile Gly Lys Cys Pro Val	275	280	285	864
gta ggt aag gca atc ata ctc gag aat gga gct gat ttt ttg agc agc Val Gly Lys Ala Ile Ile Leu Glu Asn Gly Ala Asp Phe Leu Ser Ser	290	295	300	912
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ctc agc tca ccc aat gaa gag gat gct ata aat tac ccc tgc gat atc 1776  
Leu Ser Ser Pro Asn Glu Glu Asp Ala Ile Asn Tyr Pro Cys Asp Ile  
580 585 590

gtt cag ggc aag ggg ttt ttg aag aac cca aac ggt gga aaa aag aat 1824  
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Val Leu Ala Val Leu Ala Tyr Phe Gly Tyr Arg Tyr Tyr Ser Lys Asn  
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cac ttg aaa aaa cac aat tcc cag ata tat gaa gat gat aac gtg aac 2208  
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725 730 735

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755 760 765

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10/29

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Asn Phe Tyr Asn Gly Lys Phe Asn Gln Lys Ser Arg Ile Gly Pro Gly  
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Lys Val Val Asn Asn Ser Arg Asn Leu Val Glu Gly Glu Thr Leu Ser  
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Lys Asp Asp Asn Lys Thr Lys Ser Lys Ile Lys Ser Lys Thr Ala Ser  
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 115 120 125

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Thr Ser Asn Arg Thr Pro Phe Glu Val Ser Leu Ile Gln Ser Asn Ser  
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Ser Leu Ser Pro Ile His Asn Ser Ser Thr Gln Asn Ser Ser His His  
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Asn Gly Phe Ser Gly Ser Thr Val Asn Asn Thr Ser Leu Ile Glu Thr  
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Gln Ser Gly Leu Ile Ser Ser Arg Ala Asp Lys Lys Lys Arg Ser Gly  
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12/29

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 115 120 125

tac act ggc agg gct ctg aac tac gtt cgt aag gct ata cta cca tat Tyr Thr Gly Arg Ala Leu Asn Tyr Val Arg Lys Ala Ile Leu Pro Tyr 130 135 140	432
ggt cgc aag aat gta ccc aag gca ctg tta ctg atc act gat gga gta Gly Arg Lys Asn Val Pro Lys Ala Leu Leu Ile Thr Asp Gly Val 145 150 155 160	480
tct tcg gat gga agt tac act gca cag gtt gcg gct atg ctt cgt gat Ser Ser Asp Gly Ser Tyr Thr Ala Gln Val Ala Ala Met Leu Arg Asp 165 170 175	528
gaa ggt gta aat gta atg gtt att ggt gtc ggt gat gta aat gtt gct Glu Gly Val Asn Val Met Val Ile Gly Val Gly Asp Val Asn Val Ala 180 185 190	576
gaa tgc cgt ggc ata gta gga tgt gat gga ata atg gat tgt cct atg Glu Cys Arg Gly Ile Val Gly Cys Asp Gly Ile Met Asp Cys Pro Met 195 200 205	624
ttc aag cag acc aac tgg aag gat atc atg ggc ctc ttt aac agt tta Phe Lys Gln Thr Asn Trp Lys Asp Ile Met Gly Leu Phe Asn Ser Leu 210 215 220	672
atg aag gag gta tgt gat att tta cct cag gac gct gtt tgt gag cct Met Lys Glu Val Cys Asp Ile Leu Pro Gln Asp Ala Val Cys Glu Pro 225 230 235 240	720
gta tgg gca gaa tgg tca tct tgt aac ggg gaa tgt ggc gtt cct ggt Val Trp Ala Glu Trp Ser Ser Cys Asn Gly Glu Cys Gly Val Pro Gly 245 250 255	768
aaa cga act cgt gct ctt ttg gac ctc cga atg att gaa aag ccc gta Lys Arg Thr Arg Ala Leu Leu Asp Leu Arg Met Ile Glu Lys Pro Val 260 265 270	816
aat ggc tcg aat gga caa ccg ggt aaa tca tgt gag gat cag aag atg Asn Gly Ser Asn Gly Gln Pro Gly Lys Ser Cys Glu Asp Gln Lys Met 275 280 285	864
aac ttc tta ccc caa tca gag aca tgc acc ata gaa tgc aat cat gag Asn Phe Leu Pro Gln Ser Glu Thr Cys Thr Ile Glu Cys Asn His Glu 290 295 300	912
cct gtg cca agc tcg ccg gaa cct gta tca gat gat atg gat cac cca Pro Val Pro Ser Ser Pro Glu Pro Val Ser Asp Asp Met Asp His Pro 305 310 315 320	960
gaa cca act cct gtt aca ccg gaa ggt gac atg gat aaa tct cat tcc Glu Pro Thr Pro Val Thr Pro Glu Gly Asp Met Asp Lys Ser His Ser 325 330 335	1008
cat tcg agc att cca tcc acc cct gat atg cca tca agt cac agt gat His Ser Ser Ile Pro Ser Thr Pro Asp Met Pro Ser Ser His Ser Asp 340 345 350	1056
atg tca tca agc cct act gat atg tca tca agc cct act gac atg tca Met Ser Ser Ser Pro Thr Asp Met Ser Ser Ser Pro Thr Asp Met Ser 355 360 365	1104
tca agc cct act gac atg tca tca agt cac agt gac atg cca tca act	1152

Ser Ser Pro Thr Asp Met Ser Ser Ser His Ser Asp Met Pro Ser Thr	
370 375 380	
cct act ggc atg tca tca agt cac agt gat atg cca tca agt cac agt	1200
Pro Thr Gly Met Ser Ser Ser His Ser Asp Met Pro Ser Ser His Ser	
385 390 395 400	
gat atg cca tca agc cac agt gat atg tca tca agc cct act gac atg	1248
Asp Met Pro Ser Ser His Ser Asp Met Ser Ser Ser Pro Thr Asp Met	
405 410 415	
tca tca agt cac gct gat act cgt gta gga aat acc gat gaa gaa cat	1296
Ser Ser Ser His Ala Asp Thr Arg Val Gly Asn Thr Asp Glu Glu His	
420 425 430	
aac cac agg aaa gat atg gat gtc aag ttc ccc gaa aat atg gat gat	1344
Asn His Arg Lys Asp Met Asp Val Lys Phe Pro Glu Asn Met Asp Asp	
435 440 445	
atc cca gtc gag gat aat cct ata ccc aca gat cct aga cat ggc gtc	1392
Ile Pro Val Glu Asp Asn Pro Ile Pro Thr Asp Pro Arg His Gly Val	
450 455 460	
gaa cca tcg cct tct gat gtg atc cct gag gat gac caa ctt cgt agg	1440
Glu Pro Ser Pro Ser Asp Val Ile Pro Glu Asp Asp Gln Leu Arg Arg	
465 470 475 480	
acg ctt gaa atg cag cgc gaa gag gac cta aag aag gaa ttg atg ctc	1488
Thr Leu Glu Met Gln Arg Glu Glu Asp Leu Lys Lys Glu Leu Met Leu	
485 490 495	
caa cat gaa ctg aag ctt cag gaa gaa aag gaa agg gca gct att tta	1536
Gln His Glu Leu Lys Leu Gln Glu Glu Lys Glu Arg Ala Ala Ile Leu	
500 505 510	
gag aat aac act cct tat gga tcc gcc act tcc gtg tcg caa gac ggt	1584
Glu Asn Asn Thr Pro Tyr Gly Ser Ala Thr Ser Val Ser Gln Asp Gly	
515 520 525	
gaa tct cca act ggc gta ccc caa agt agc gag acc gat gca ata cgt	1632
Glu Ser Pro Thr Gly Val Pro Gln Ser Ser Glu Thr Asp Ala Ile Arg	
530 535 540	
cac gag gtg tat gac gat cac ccc gag gaa tct gaa aac acc ggg att	1680
His Glu Val Tyr Asp Asp His Pro Glu Glu Ser Glu Asn Thr Gly Ile	
545 550 555 560	
aat gct gat gtg acc gaa tct gag gac tat gag ggt gaa aaa caa aag	1728
Asn Ala Asp Val Thr Glu Ser Glu Asp Tyr Glu Gly Glu Lys Gln Lys	
565 570 575	
gac gaa tca aat gaa cgt tcg acc agc aac act act aag att gcc ggc	1776
Asp Glu Ser Asn Glu Arg Ser Thr Ser Asn Thr Thr Lys Ile Ala Gly	
580 585 590	
ggg gct cta cta ggt ctt ctt ctc ctt ggt gcc ggt ggt gga tac gct	1824
Gly Ala Leu Leu Gly Leu Leu Leu Leu Gly Ala Gly Gly Gly Tyr Ala	
595 600 605	
atg tac aaa aag aac aag aca cct act gtt gag aca ggt tca ggt gat	1872
Met Tyr Lys Lys Asn Lys Thr Pro Thr Val Glu Thr Gly Ser Gly Asp	

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        610                615                620
tac act ggg gcc gac gag agt tca gaa ccc atg aag gag ggt gac aca      1920
Tyr Thr Gly Ala Asp Glu Ser Ser Glu Pro Met Lys Glu Gly Asp Thr
625                630                635                640

tac acc gtc act gag ttt gac aac aac att tgg ggc gag gca gcg taa      1968
Tyr Thr Val Thr Glu Phe Asp Asn Asn Ile Trp Gly Glu Ala Ala
        645                650                655

<210> 6
<211> 655
<212> PRT
<213> Babesia bovis

<400> 6

Met Ile Gly Tyr Ile Lys Ile Leu Ala Ser Val Pro Leu Leu Ser Leu
1                5                10                15

Ala Phe Leu Ala Thr Thr Gly Ile His Ala Phe Ala Asp Lys Gly Ile
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Gly Ser Pro Lys Gly Lys Gln Cys Lys Lys Gln Leu Asp Phe Ser Ile
        35                40                45

Val Val Asp Glu Ser Ala Ser Ile Ser Asp Asp Gln Trp Glu Gly Gln
50                55                60

Met Ile Pro Phe Leu Arg Asn Leu Ile His Thr Val Asp Leu Asp Asn
65                70                75                80

Thr Asp Ile Arg Leu Ser Leu Thr Thr Tyr Ser Thr Pro Thr Arg Gln
        85                90                95

Ile Phe Thr Phe Leu Asp Ala Ala Ala Ser Ser Thr Arg Leu Ala Leu
        100                105                110

Thr Lys Leu Asp Trp Met Asn Gly Thr Lys Ala Arg Tyr Gly Met Thr
        115                120                125

Tyr Thr Gly Arg Ala Leu Asn Tyr Val Arg Lys Ala Ile Leu Pro Tyr
        130                135                140

Gly Arg Lys Asn Val Pro Lys Ala Leu Leu Leu Ile Thr Asp Gly Val
145                150                155                160

Ser Ser Asp Gly Ser Tyr Thr Ala Gln Val Ala Ala Met Leu Arg Asp
        165                170                175

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Glu Gly Val Asn Val Met Val Ile Gly Val Gly Asp Val Asn Val Ala  
 180 185 190

Glu Cys Arg Gly Ile Val Gly Cys Asp Gly Ile Met Asp Cys Pro Met  
 195 200 205

Phe Lys Gln Thr Asn Trp Lys Asp Ile Met Gly Leu Phe Asn Ser Leu  
 210 215 220

Met Lys Glu Val Cys Asp Ile Leu Pro Gln Asp Ala Val Cys Glu Pro  
 225 230 235 240

Val Trp Ala Glu Trp Ser Ser Cys Asn Gly Glu Cys Gly Val Pro Gly  
 245 250 255

Lys Arg Thr Arg Ala Leu Leu Asp Leu Arg Met Ile Glu Lys Pro Val  
 260 265 270

Asn Gly Ser Asn Gly Gln Pro Gly Lys Ser Cys Glu Asp Gln Lys Met  
 275 280 285

Asn Phe Leu Pro Gln Ser Glu Thr Cys Thr Ile Glu Cys Asn His Glu  
 290 295 300

Pro Val Pro Ser Ser Pro Glu Pro Val Ser Asp Asp Met Asp His Pro  
 305 310 315 320

Glu Pro Thr Pro Val Thr Pro Glu Gly Asp Met Asp Lys Ser His Ser  
 325 330 335

His Ser Ser Ile Pro Ser Thr Pro Asp Met Pro Ser Ser His Ser Asp  
 340 345 350

Met Ser Ser Ser Pro Thr Asp Met Ser Ser Ser Pro Thr Asp Met Ser  
 355 360 365

Ser Ser Pro Thr Asp Met Ser Ser Ser His Ser Asp Met Pro Ser Thr  
 370 375 380

Pro Thr Gly Met Ser Ser Ser His Ser Asp Met Pro Ser Ser His Ser  
 385 390 395 400

Asp Met Pro Ser Ser His Ser Asp Met Ser Ser Ser Pro Thr Asp Met  
 405 410 415

Ser Ser Ser His Ala Asp Thr Arg Val Gly Asn Thr Asp Glu Glu His  
 420 425 430

Asn His Arg Lys Asp Met Asp Val Lys Phe Pro Glu Asn Met Asp Asp  
 435 440 445

Ile Pro Val Glu Asp Asn Pro Ile Pro Thr Asp Pro Arg His Gly Val  
 450 455 460

Glu Pro Ser Pro Ser Asp Val Ile Pro Glu Asp Asp Gln Leu Arg Arg  
 465 470 475 480

Thr Leu Glu Met Gln Arg Glu Glu Asp Leu Lys Lys Glu Leu Met Leu  
 485 490 495

Gln His Glu Leu Lys Leu Gln Glu Glu Lys Glu Arg Ala Ala Ile Leu  
 500 505 510

Glu Asn Asn Thr Pro Tyr Gly Ser Ala Thr Ser Val Ser Gln Asp Gly  
 515 520 525

Glu Ser Pro Thr Gly Val Pro Gln Ser Ser Glu Thr Asp Ala Ile Arg  
 530 535 540

His Glu Val Tyr Asp Asp His Pro Glu Glu Ser Glu Asn Thr Gly Ile  
 545 550 555 560

Asn Ala Asp Val Thr Glu Ser Glu Asp Tyr Glu Gly Glu Lys Gln Lys  
 565 570 575

Asp Glu Ser Asn Glu Arg Ser Thr Ser Asn Thr Thr Lys Ile Ala Gly  
 580 585 590

Gly Ala Leu Leu Gly Leu Leu Leu Leu Gly Ala Gly Gly Gly Tyr Ala  
 595 600 605

Met Tyr Lys Lys Asn Lys Thr Pro Thr Val Glu Thr Gly Ser Gly Asp  
 610 615 620

Tyr Thr Gly Ala Asp Glu Ser Ser Glu Pro Met Lys Glu Gly Asp Thr  
 625 630 635 640

Tyr Thr Val Thr Glu Phe Asp Asn Asn Ile Trp Gly Glu Ala Ala  
 645 650 655

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 <212> DNA  
 <213> Theileria annulata

<220>  
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 <222> (1)..(1047)

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 cac agg gaa ttg gac tta aca ata tta gtc gat gaa tcc tcg agt atc 96  
 His Arg Glu Leu Asp Leu Thr Ile Leu Val Asp Glu Ser Ser Ser Ile  
 20 25 30  
 tat att gaa gag tgg aac aaa ctc att cca ttt ctt aaa tca ctg gtg 144  
 Tyr Ile Glu Glu Trp Asn Lys Leu Ile Pro Phe Leu Lys Ser Leu Val  
 35 40 45  
 aga tca ata aat ata agt cca aat tat gtg cac ttg tca atg gtc acc 192  
 Arg Ser Ile Asn Ile Ser Pro Asn Tyr Val His Leu Ser Met Val Thr  
 50 55 60  
 ttt tcc act tca att cgg tgg tta ata tca ttt ctc gac cca gcc tct 240  
 Phe Ser Thr Ser Ile Arg Trp Leu Ile Ser Phe Leu Asp Pro Ala Ser  
 65 70 75 80  
 aag gat gag caa ttg gcc ctt gct gtt ctg gac aag ctg aag aac agt 288  
 Lys Asp Glu Gln Leu Ala Leu Ala Val Leu Asp Lys Leu Lys Asn Ser  
 85 90 95  
 aag cct gtg ttt ggg tac aca ttc act gga cag gca ctt aac ttt att 336  
 Lys Pro Val Phe Gly Tyr Thr Phe Thr Gly Gln Ala Leu Asn Phe Ile  
 100 105 110  
 tct gag gct gtt tat atg ttt ggt gct agg cgt aac tct cca aag ggc 384  
 Ser Glu Ala Val Tyr Met Phe Gly Ala Arg Arg Asn Ser Pro Lys Gly  
 115 120 125  
 atc att atc atc acc gac gga tcc tct act cag aca aac gtt act tct 432  
 Ile Ile Ile Ile Thr Asp Gly Ser Ser Thr Gln Thr Asn Val Thr Ser  
 130 135 140  
 cag gcg tcg gct cta cta agg gat gct ggt gta aca att cta gtt gtt 480  
 Gln Ala Ser Ala Leu Leu Arg Asp Ala Gly Val Thr Ile Leu Val Val  
 145 150 155 160  
 gga gtt ggg aag gct aaa gaa agc gag tgt aga ggt ata gtt ggt tgt 528  
 Gly Val Gly Lys Ala Lys Glu Ser Glu Cys Arg Gly Ile Val Gly Cys  
 165 170 175  
 tct acc aaa gga gag tgc ccc ctt ttc ttt atg acc aac tgg gat gaa 576  
 Ser Thr Lys Gly Glu Cys Pro Leu Phe Phe Met Thr Asn Trp Asp Glu  
 180 185 190  
 att atc agg aag gtt ggg gag ttg atg gct gag gtt tgt gag acc att 624  
 Ile Ile Arg Lys Val Gly Glu Leu Met Ala Glu Val Cys Glu Thr Ile

195	200	205	
cct aag gac gcc gta tgt aag ccg atc tgg tct gat tgg tct aag tgt			672
Pro Lys Asp Ala Val Cys Lys Pro Ile Trp Ser Asp Trp Ser Lys Cys			
210	215	220	
gac gcc aag tgc ggc att ggg acg agg tac caa aag ttg atg gga gtt			720
Asp Ala Lys Cys Gly Ile Gly Thr Arg Tyr Gln Lys Leu Met Gly Val			
225	230	235	240
act aca att tct gag cca act gtc gga acg aac ggc aag tcc ggg agg			768
Thr Thr Ile Ser Glu Pro Thr Val Gly Thr Asn Gly Lys Ser Gly Arg			
	245	250	255
aca tgt gag atg att tat gag aac gtc gag gtt cca aag gag gag tgc			816
Thr Cys Glu Met Ile Tyr Glu Asn Val Glu Val Pro Lys Glu Glu Cys			
	260	265	270
tcc gtt gag tct aag att gct gga gga gtg gct cta gca ctg tta atg			864
Ser Val Glu Ser Lys Ile Ala Gly Gly Val Ala Leu Ala Leu Leu Met			
	275	280	285
ctt gca ggc gga ggt ggt tac aca tac tac aaa aag tac ggt tta tct			912
Leu Ala Gly Gly Gly Tyr Thr Tyr Tyr Lys Lys Tyr Gly Leu Ser			
	290	295	300
aga gtg agt gaa act acg aat ttg gat gag gat ttt gca gat tct agt			960
Arg Val Ser Glu Thr Thr Asn Leu Asp Glu Asp Phe Ala Asp Ser Ser			
	305	310	315
ggg aac cgt ggt gta agg gag agt gtg ggt gaa gct tac aca gta act			1008
Gly Asn Arg Gly Val Arg Glu Ser Val Gly Glu Ala Tyr Thr Val Thr			
	325	330	335
gat tta gat gat gga ctc tgg agc caa tcc aat caa taa			1047
Asp Leu Asp Asp Gly Leu Trp Ser Gln Ser Asn Gln			
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<210> 8			
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<212> PRT			
<213> Theileria annulata			
<400> 8			
Asp Lys Gly Leu Tyr Pro Asp Gly Ile Lys Lys Pro Ser Ser Tyr Cys			
1	5	10	15
His Arg Glu Leu Asp Leu Thr Ile Leu Val Asp Glu Ser Ser Ser Ile			
	20	25	30
Tyr Ile Glu Glu Trp Asn Lys Leu Ile Pro Phe Leu Lys Ser Leu Val			
	35	40	45
Arg Ser Ile Asn Ile Ser Pro Asn Tyr Val His Leu Ser Met Val Thr			
	50	55	60

Phe Ser Thr Ser Ile Arg Trp Leu Ile Ser Phe Leu Asp Pro Ala Ser  
 65 70 75 80

Lys Asp Glu Gln Leu Ala Leu Ala Val Leu Asp Lys Leu Lys Asn Ser  
 85 90 95

Lys Pro Val Phe Gly Tyr Thr Phe Thr Gly Gln Ala Leu Asn Phe Ile  
 100 105 110

Ser Glu Ala Val Tyr Met Phe Gly Ala Arg Arg Asn Ser Pro Lys Gly  
 115 120 125

Ile Ile Ile Ile Thr Asp Gly Ser Ser Thr Gln Thr Asn Val Thr Ser  
 130 135 140

Gln Ala Ser Ala Leu Leu Arg Asp Ala Gly Val Thr Ile Leu Val Val  
 145 150 155 160

Gly Val Gly Lys Ala Lys Glu Ser Glu Cys Arg Gly Ile Val Gly Cys  
 165 170 175

Ser Thr Lys Gly Glu Cys Pro Leu Phe Phe Met Thr Asn Trp Asp Glu  
 180 185 190

Ile Ile Arg Lys Val Gly Glu Leu Met Ala Glu Val Cys Glu Thr Ile  
 195 200 205

Pro Lys Asp Ala Val Cys Lys Pro Ile Trp Ser Asp Trp Ser Lys Cys  
 210 215 220

Asp Ala Lys Cys Gly Ile Gly Thr Arg Tyr Gln Lys Leu Met Gly Val  
 225 230 235 240

Thr Thr Ile Ser Glu Pro Thr Val Gly Thr Asn Gly Lys Ser Gly Arg  
 245 250 255

Thr Cys Glu Met Ile Tyr Glu Asn Val Glu Val Pro Lys Glu Glu Cys  
 260 265 270

Ser Val Glu Ser Lys Ile Ala Gly Gly Val Ala Leu Ala Leu Leu Met  
 275 280 285

Leu Ala Gly Gly Gly Gly Tyr Thr Tyr Tyr Lys Lys Tyr Gly Leu Ser  
 290 295 300

Arg Val Ser Glu Thr Thr Asn Leu Asp Glu Asp Phe Ala Asp Ser Ser  
305 310 315 320

Gly Asn Arg Gly Val Arg Glu Ser Val Gly Glu Ala Tyr Thr Val Thr  
325 330 335

Asp Leu Asp Asp Gly Leu Trp Ser Gln Ser Asn Gln  
340 345

<210> 9  
<211> 2259  
<212> DNA  
<213> Babesia bovis

<220>  
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<222> (552)..(2189)

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ctgggcgcaa ctccctaattg gaggccgct cccaggaggc cacagaacaa tggagtacaa 120  
cgctcaaaac cgcagtgaat gttagctaca atatgtacat attgtcatgg agttcgtaat 180  
cctaacaaag gccattgtat cgtcaatgtg gtctaccagt ggacgtcgt tgtggaggcc 240  
agggtacatc aaatccctga gaacacctat cgtccggtgt tacgggtgga atgggttact 300  
ataaaagcaa atttaattgt agatattgta aaaaaactgt aaaattgggt agtgcttgca 360  
ccgtcctggt cccgcgattt ggataccgct gtgctacgct ttgcacggaa tcacgacgtc 420  
gtgcataacg ctgtgcttat gacttcgtac acatcaaacg actttaactg ccgttggttt 480  
atatacgttg gcgttaggtt gttttgggtg ttattgtact gtggaatcat acacattcta 540  
cacgtgtcat g atg gtg aag ttc cac aca tta tcg gtt gca gcc atc ctg 590  
Met Val Lys Phe His Thr Leu Ser Val Ala Ala Ile Leu  
1 5 10  
gcg att gct tca tcc aat act att ttt gct aca ttt aga tca aat gga 638  
Ala Ile Ala Ser Ser Asn Thr Ile Phe Ala Thr Phe Arg Ser Asn Gly  
15 20 25  
aaa acc ttc gga gat gaa tct gtt agc ctt cta gaa cat gaa agt acc 686  
Lys Thr Phe Gly Asp Glu Ser Val Ser Leu Leu Glu His Glu Ser Thr  
30 35 40 45  
agt ttg tct cgt ggt cct aga cca acc gaa gat caa atc agt cag tta 734  
Ser Leu Ser Arg Gly Pro Arg Pro Thr Glu Asp Gln Ile Ser Gln Leu  
50 55 60  
cca aaa aat gtt ttc ttt cta ttg gat aac agc att gat atg tct att 782  
Pro Lys Asn Val Phe Phe Leu Leu Asp Asn Ser Ile Asp Met Ser Ile  
65 70 75

gaa act gga gaa gag aat cgt cat ttc ctc tcc gag ttt ttt aaa ttg Glu Thr Gly Glu Glu Asn Arg His Phe Leu Ser Glu Phe Phe Lys Leu 80 85 90	830
tta aaa aaa tat gaa gga ata aat gtt tca cta ata agg tac aat agt Leu Lys Lys Tyr Glu Gly Ile Asn Val Ser Leu Ile Arg Tyr Asn Ser 95 100 105	878
gaa gaa ccg tta ggt tcg acg aaa gca tta acc aac ggg gag ttg aaa Glu Glu Pro Leu Gly Ser Thr Lys Ala Leu Thr Asn Gly Glu Leu Lys 110 115 120 125	926
aaa cta tcc gat aat att cct act aaa atg cct ttt gac att ggc gtt Lys Leu Ser Asp Asn Ile Pro Thr Lys Met Pro Phe Asp Ile Gly Val 130 135 140	974
gtt cct act ggt ata gga gct gcc ctc aaa cag ata aaa aca ttg tac Val Pro Thr Gly Ile Gly Ala Ala Leu Lys Gln Ile Lys Thr Leu Tyr 145 150 155	1022
cct gat cac gaa aag ttc ctt gtt ggg aac acc att act gag ttg gat Pro Asp His Glu Lys Phe Leu Val Gly Asn Thr Ile Thr Glu Leu Asp 160 165 170	1070
tat tct aaa gca ttg ggt aag gat att gtt gta atc gtg ttt act act Tyr Ser Lys Ala Leu Gly Lys Asp Ile Val Val Ile Val Phe Thr Thr 175 180 185	1118
ggc cac gtc att gat cca tat tta gca tat gat gag gca ttt gat gcc Gly His Val Ile Asp Pro Tyr Leu Ala Tyr Asp Glu Ala Phe Asp Ala 190 195 200 205	1166
cgc cgt aat ggt gta aga ttt tac gtt att aat agg gga gga aag gca Arg Arg Asn Gly Val Arg Phe Tyr Val Ile Asn Arg Gly Gly Lys Ala 210 215 220	1214
aaa aac tat tgg act cag cta ttg gga tgc cac tac aat act tgt ttg Lys Asn Tyr Trp Thr Gln Leu Leu Gly Cys His Tyr Asn Thr Cys Leu 225 230 235	1262
agt tat att cgg gcc aaa ata aca agg cct tca cta tat ctc gat gtt Ser Tyr Ile Arg Ala Lys Ile Thr Arg Pro Ser Leu Tyr Leu Asp Val 240 245 250	1310
ttg gtg aac agg att gtg tct aaa cgc gcg aaa gat gcc gtt tgt ttg Leu Val Asn Arg Ile Val Ser Lys Arg Ala Lys Asp Ala Val Cys Leu 255 260 265	1358
gaa gtg tgg acg gat tat aaa cct aac act gaa aaa tcg gat gtg agg Glu Val Trp Thr Asp Tyr Lys Pro Asn Thr Glu Lys Ser Asp Val Arg 270 275 280 285	1406
att atg act tct acg ttg aaa tta tac aaa acc ctt ctt act gga agc Ile Met Thr Ser Thr Leu Lys Leu Tyr Lys Thr Leu Leu Thr Gly Ser 290 295 300	1454
ttt gcg gag ara aac atc aaa ggt ctc aca tgt gat gag cag cta aag Phe Ala Glu Xaa Asn Ile Lys Gly Leu Thr Cys Asp Glu Gln Leu Lys 305 310 315	1502
gat atg cag aaa aga caa ata ttt tgc tac tca aat aag tgt gct ccc	1550

Asp Met Gln Lys Arg Gln Ile Phe Cys Tyr Ser Asn Lys Cys Ala Pro	
320 325 330	
acg atc tat tca aga tct tat gtt gac tta gct att caa cgt ctt aat	1598
Thr Ile Tyr Ser Arg Ser Tyr Val Asp Leu Ala Ile Gln Arg Leu Asn	
335 340 345	
gca aaa gat ttt aaa gag gta cta gat gag tca tct tac aga tca cgc	1646
Ala Lys Asp Phe Lys Glu Val Leu Asp Glu Ser Ser Tyr Arg Ser Arg	
350 355 360 365	
agt ttg caa tca gtg gag aaa cat aat gag caa caa aca ggt tct caa	1694
Ser Leu Gln Ser Val Glu Lys His Asn Glu Gln Gln Thr Gly Ser Gln	
370 375 380	
gaa acg ctt tct gga agc gcc cgt gta gaa aca agc tta gaa agc tca	1742
Glu Thr Leu Ser Gly Ser Ala Arg Val Glu Thr Ser Leu Glu Ser Ser	
385 390 395	
gta cct tca tcc tat gtg gca gaa ttg gga gaa agt gat aca gaa aca	1790
Val Pro Ser Ser Tyr Val Ala Glu Leu Gly Glu Ser Asp Thr Glu Thr	
400 405 410	
tac aaa cag ttg gag tac ata gat aaa aat ggc gtc act gtc ttc aac	1838
Tyr Lys Gln Leu Glu Tyr Ile Asp Lys Asn Gly Val Thr Val Phe Asn	
415 420 425	
gat gag ccc act gtt gtt gtc gat act ccc gag tac gta caa aag gtg	1886
Asp Glu Pro Thr Val Val Val Asp Thr Pro Glu Tyr Val Gln Lys Val	
430 435 440 445	
cat gaa aga gaa atg cag ttt gat gaa gaa tcc acc cat ctt ccc aac	1934
His Glu Arg Glu Met Gln Phe Asp Glu Glu Ser Thr His Leu Pro Asn	
450 455 460	
tct ggt aac cac cat cca cct cat cac cga aag ggg gcc aac gga tcc	1982
Ser Gly Asn His His Pro Pro His His Arg Lys Gly Ala Asn Gly Ser	
465 470 475	
ggt aaa aag acc acg atc gtc gtt ggt att ata tgc ctt gta gta ata	2030
Gly Lys Lys Thr Thr Ile Val Val Gly Ile Ile Cys Leu Val Val Ile	
480 485 490	
tgc gcc gtc ata gcc ggc gcc tac cta tcc ctt tca cag caa gag tct	2078
Cys Ala Val Ile Ala Gly Ala Tyr Leu Ser Leu Ser Gln Gln Glu Ser	
495 500 505	
gtg gaa ctc acc tct gaa gag ggt gac ttc ttg aac gac act acg ggt	2126
Val Glu Leu Thr Ser Glu Glu Gly Asp Phe Leu Asn Asp Thr Thr Gly	
510 515 520 525	
ggt caa cct gag gta ctc gaa aca caa cag gtt gtg gat gca gag aac	2174
Gly Gln Pro Glu Val Leu Glu Thr Gln Val Val Asp Ala Glu Asn	
530 535 540	
aaa aca tgg ttg taa gacacgaaac gggttgtcac agccaacata tacaaatgca	2229
Lys Thr Trp Leu	
545	
gtttaaatta agtcactagt taataaaaaa	2259



<210> 10  
 <211> 545  
 <212> PRT  
 <213> Babesia bovis

<220>  
 <221> misc\_feature  
 <222> (305)..(305)  
 <223> The 'Xaa' at location 305 stands for Arg, or Lys.

<400> 10

Met Val Lys Phe His Thr Leu Ser Val Ala Ala Ile Leu Ala Ile Ala  
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Ser Ser Asn Thr Ile Phe Ala Thr Phe Arg Ser Asn Gly Lys Thr Phe  
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Gly Asp Glu Ser Val Ser Leu Leu Glu His Glu Ser Thr Ser Leu Ser  
 35 40 45

Arg Gly Pro Arg Pro Thr Glu Asp Gln Ile Ser Gln Leu Pro Lys Asn  
 50 55 60

Val Phe Phe Leu Leu Asp Asn Ser Ile Asp Met Ser Ile Glu Thr Gly  
 65 70 75 80

Glu Glu Asn Arg His Phe Leu Ser Glu Phe Phe Lys Leu Leu Lys Lys  
 85 90 95

Tyr Glu Gly Ile Asn Val Ser Leu Ile Arg Tyr Asn Ser Glu Glu Pro  
 100 105 110

Leu Gly Ser Thr Lys Ala Leu Thr Asn Gly Glu Leu Lys Lys Leu Ser  
 115 120 125

Asp Asn Ile Pro Thr Lys Met Pro Phe Asp Ile Gly Val Val Pro Thr  
 130 135 140

Gly Ile Gly Ala Ala Leu Lys Gln Ile Lys Thr Leu Tyr Pro Asp His  
 145 150 155 160

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Arg Ala Lys Ile Thr Arg Pro Ser Leu Tyr Leu Asp Val Leu Val Asn  
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Lys Arg Gln Ile Phe Cys Tyr Ser Asn Lys Cys Ala Pro Thr Ile Tyr  
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Ser Arg Ser Tyr Val Asp Leu Ala Ile Gln Arg Leu Asn Ala Lys Asp  
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Ser Tyr Val Ala Glu Leu Gly Glu Ser Asp Thr Glu Thr Tyr Lys Gln  
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Leu Glu Tyr Ile Asp Lys Asn Gly Val Thr Val Phe Asn Asp Glu Pro  
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Thr Val Val Val Asp Thr Pro Glu Tyr Val Gln Lys Val His Glu Arg

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Glu Met Gln Phe Asp Glu Glu Ser Thr His Leu Pro Asn Ser Gly Asn  
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His His Pro Pro His His Arg Lys Gly Ala Asn Gly Ser Gly Lys Lys  
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Thr Thr Ile Val Val Gly Ile Ile Cys Leu Val Val Ile Cys Ala Val  
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Ile Ala Gly Ala Tyr Leu Ser Leu Ser Gln Gln Glu Ser Val Glu Leu  
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Thr Ser Glu Glu Gly Asp Phe Leu Asn Asp Thr Thr Gly Gly Gln Pro  
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